6th Grade Mathematics

Geometry – Unit 5a, Curriculum Map
May 12th – June 6th

ORANGE PUBLIC SCHOOLS

OFFICE OF CURRICULUM AND INSTRUCTION

OFFICE OF MATHEMATICS

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Unit Overview

In this unit, students will ….

- Find the area of triangles, quadrilaterals, and composite shapes
- Analyze three dimensional shapes using nets
- Compute volume and surface area of three dimensional shapes

Enduring Understandings

- The area of a composite figure can be calculated by breaking the figure into regular shapes
- Be mindful of units when calculating area, volume, and surface area
- The volume of a shape consists of the number of cubes that fit inside of the shape with no gaps or overlaps

CMP3 Pacing Guide

Upon completion of the materials below, teachers should move onto the Unit 5b plan and student portfolio notebook.

Activity	Common Core Standards	Estimated Time
Covering and Surrounding - Investigation 1 *Problem 1.1 – Area and Perimeter* *Problem 1.2 – Constant Perimeter, Changing Area* *Problem 1.3 – Constant Area, Changing Perimeter*	6.G.1, 6.G.2, 6.G.3, 6.G.4	2 days
Covering and Surrounding - Investigation 2 *Problem 2.1 – Finding Area and Perimeter of Triangles* *Problem 2.2 – Identifying Base and Height* *Problem 2.3 – Maintaining the Base and the Height* *Problem 2.4 – Designing Triangles Under Constraints*		3 days
Covering and Surrounding - Investigation 3 *Problem 3.1 – Finding the Area and Perimeter of Parallelograms* *Problem 3.2 – Maintaining the Base and Height* *Problem 3.3 – Designing Parallelograms Under Constraints* *Problem 3.4 – Polygons on Coordinate Grids*		3 days
Covering and Surrounding - Investigation 4 *Problem 4.1 – Making Rectangular Boxes* *Problem 4.2 – Finding Volume* *Problem 4.3 – Finding Surface Area*		2 days
Optional Unit 5a Mini-Assessment	6.G.1-6.G.4	1 day

Optional Review Content Curriculum Guide – CMP3

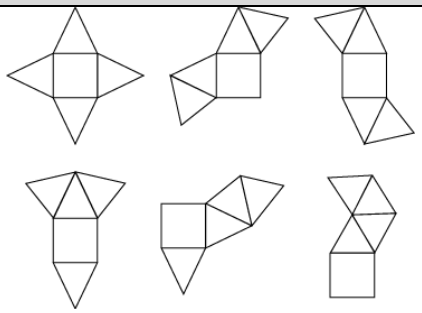
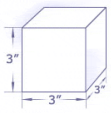
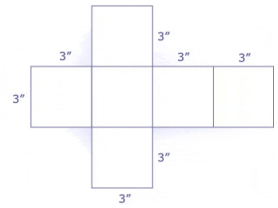
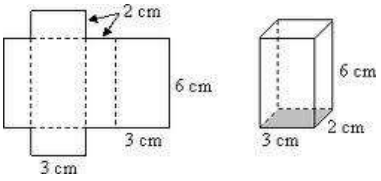
These problems are for students who need review to strengthen their fluency skills and data calculations. Please refer to the Unit 1 and Unit 4 plans for vocabulary, teaching to multiple representations, connections to the Mathematical Practices, and potential misconceptions.

Optional Activity	Common Core Standards	Estimated Time
Optional Selected Review – For students who need to strengthen their decimal fluency skills and statistical calculations **Decimal Ops** Investigation 1**:** *Problems 1.1, 1.2, 1.3 (Operations, Calculations, Rates, Ratios, and Decimals)* *Investigation 2: Problems 2.1, 2.2, 2.3 (Adding and Subtracting Decimals)* *Investigation 3: Problems 3.1, 3.2, 3.3, 3.4, 3.5 (Multiplying and Dividing Decimals)* *Investigation 4: Problems 4.1, 4.2, 4.3, 4.4 (Tax, Tips, Discounts)* **Data About Us** *Investigation 3: Problems 3.1, 3.2, 3.3 (IQR, Variability, and MAD)*	6.NS.3, 6.SP.1-5	TBD by Teacher

Common Core Standards

COMMON CORE STANDARDS		CALCULATOR ALLOWED?
6.G.1	Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.	YES
6.G.2	Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = l\ w\ h$ and $V = b\ h$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.	YES
6.G.3	Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.	YES
6.G.4	Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.	YES

Teaching Multiple Representations

CONCRETE REPRESENTATIONS	
NETS	
PICTORIAL REPRESENTATIONS	
Pictorial: Area of a Triangle	6u  8u $6u \times 8u = 48u^2$ $6u \times 8u / 2 = 48u^2/2 = 24u^2$
Surface Area	 
Volume	
ABSTRACT REPRESENTATIONS	
Area of a Triangle $A = \frac{1}{2}bh$ Volume of a rectangular prism: l·w·h Surface Area of a Rectangular Prism = 2ab + 2bc + 2ac	

Connections to the Mathematical Practices

1	Make sense of problems and persevere in solving them
	- Students will decompose composite figures to find the volume, students will also decompose three dimensional figures when creating or identifying a net to calculate surface area
2	Reason abstractly and quantitatively
	- Students will find the volume and area of a shape with fractional side lengths, students will reason about volume and different views of nets and three-dimensional figures
3	Construct viable arguments and critique the reasoning of others
	- Students will justify why "formulas" work for finding the surface area, volume, and area of shapes. Students will justify how they made these calculations.
4	Model with mathematics
	- Students will use unit cubes, manipulatives, nets, and three dimensional shapes to find the volume, area, or surface area of figures. Students will use formulas when appropriate.
5	Use appropriate tools strategically
	- Students use graph paper, rulers, unit cubes, manipulatives, nets, and drawings to calculate measurements.
6	Attend to precision
	- Students will use appropriate labels and units of measurement
7	Look for and make use of structure
	- Students seek patterns or structures to understand the purpose and accuracy of formulas to calculate volume, area, and surface area.
8	Look for and express regularity in repeated reasoning
	- Students will use side lengths and properties of figures to justify why volume, area, and surface area expressions are accurate.

Vocabulary

Term	Definition
2-Dimensional	A shape that does not have thickness, only two sides (length and width)
3-Dimensional	A shape that has thickness, width, depth, and height
Area	The number of units to fill a surface
Cubic Units	The volume of an object is measured in cubic unit
Face	A surface of a three dimensional figure
Net	A three dimensional figure that has been “unwrapped” to be two-dimensional
Volume	The amount of space occupied by an object

Potential Student Misconceptions

- Students may use the side length of a triangle in place of the height rather than understanding the height bust be perpendicular to the base

Extensions and Sources

Online Resources

http://www.illustrativemathematics.org/standards/k8
- Performance tasks, scoring guides

http://www.ixl.com/math/grade-6
- Interactive, visually appealing fluency practice site that is objective descriptive

https://www.khanacademy.org/
- Interactive, tracks student points, objective descriptive videos, allows for hints

http://www.doe.k12.de.us/assessment/files/Math_Grade_6.pdf
- Common Core aligned assessment questions, including Next Generation Assessment Prototypes

https://www.georgiastandards.org/Common-Core/Pages/Math-6-8.aspx

- Common core assessments and tasks designed for students with special needs

http://www.parcconline.org/sites/parcc/files/PARCCMCFMathematicsGRADE8_Nov2012V3_FINAL.pdf
- PARCC Model Content Frameworks Grade 8

http://commoncoretools.files.wordpress.com/2011/04/ccss_progression_ee_2011_04_25.pdf
- Progressions of Expressions and Equations from grades 6-8

http://www.engageny.org/resource/grade-6-mathematics-module-5
- Guided practice, independent practice, performance tasks